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NPIC/R-360/63
December 1963



PHOTOGRAPHIC INTERPRETATION REPORT

SA-2 AND SA-3 SAM DEFENSES, LENINGRAD, USSR

DECLASS REVIEW by NIMA/DOD

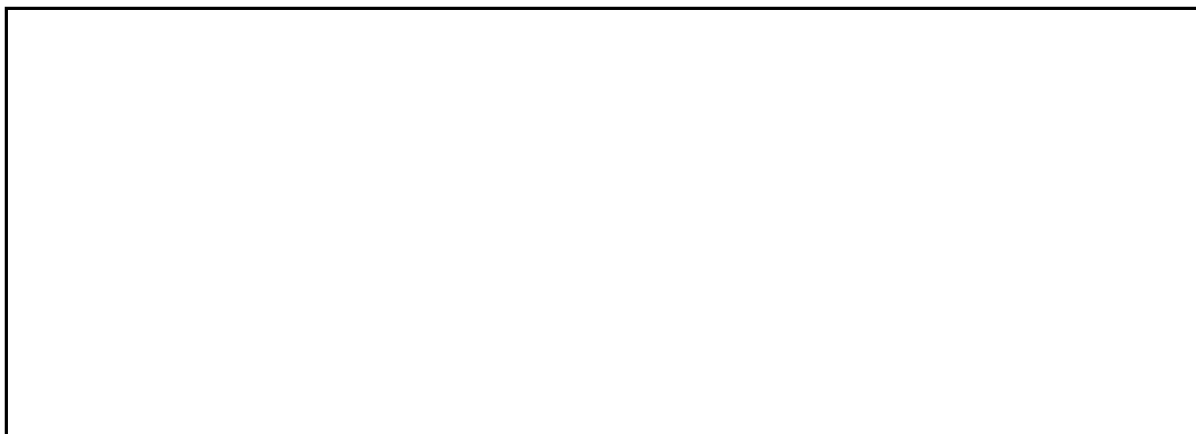


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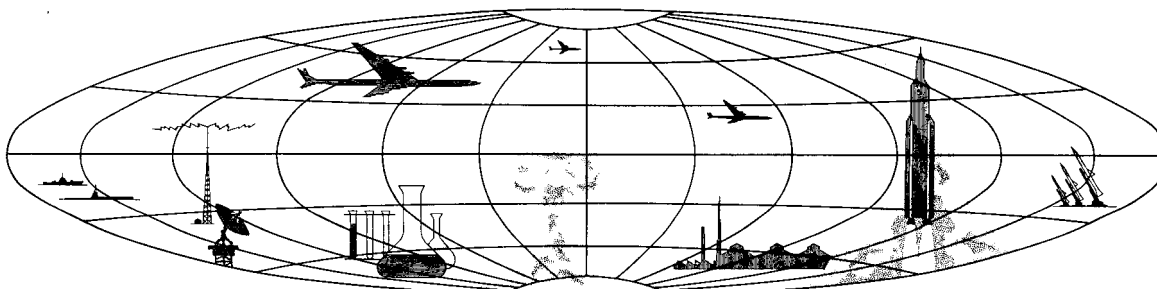


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SA-2 AND SA-3 SAM DEFENSES,
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PREFACE

This report has been prepared in partial response to several requirements for a comprehensive study of the Leningrad defense systems. It presents the chronological development and other information concerning the surface-to-air missile (SAM) sites deployed around Leningrad and is intended to complement forthcoming NPIC reports which will update information on the probable antimissile missile (AMM) installations at Leningrad and Sary Shagan.

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Photography used in the preparation of this report includes [redacted] coverage of the Leningrad area through [redacted]. An attempt is made to reconstruct the chronological development of the Leningrad SAM defense ring.

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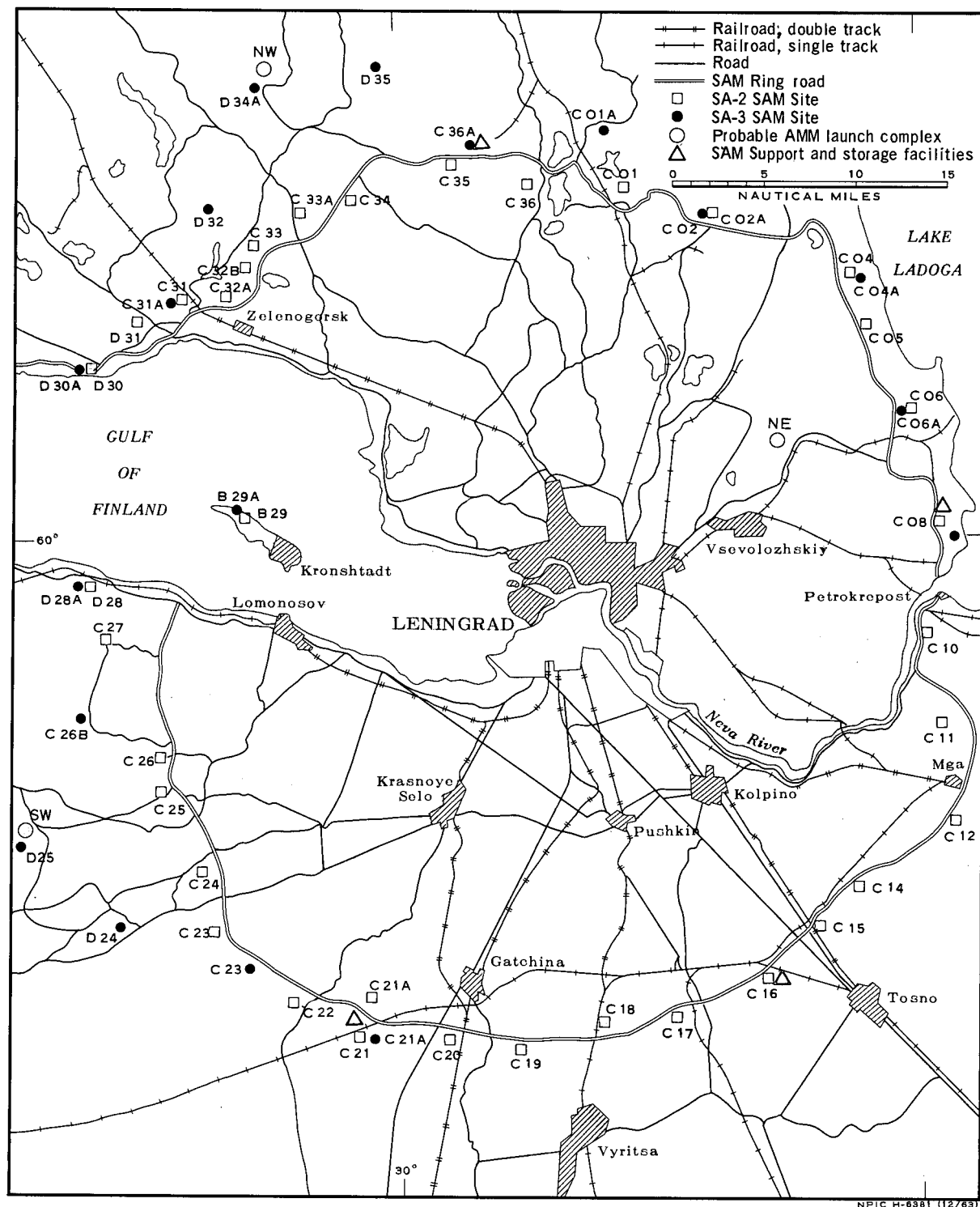
This report does not discuss the four Leningrad SAM support and storage facilities in detail as a future NPIC report will treat this subject separately.

New and revised information from later missions on Leningrad SA-3 activities contained in this report supersedes any conflicting data published in NPIC report R-207/63. 1/

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INTRODUCTION

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A total of 36 SA-2 SAM sites, 18 SA-3 SAM sites, and 4 SAM support and storage facilities have been deployed around Leningrad since []

[] First evidence of SAM activity at Leningrad appeared in [] when portions of the Leningrad SAM ring road were covered by [] photography.

There is an hiatus of photography between

[] when no coverage of the area was provided.

The deployment of SA-3s around Leningrad was begun in [] and has continued to date. The pattern of their deployment is more readily traceable than for the SA-2s because more intensive photographic coverage is provided during this period.

SA-2 SAM DEPLOYMENT

First photographic evidence of SAM activity at Leningrad appeared in [] when portions of the Leningrad SAM ring road, access roads, and construction activity at one of the SAM support facilities were observed on [] coverage.

A prototype research and development SA-2 site was observed at the Kapustin Yar/Vladim-

irovka Missile Test Center, USSR, in []

[] It is believed that the development of the SA-2 system was begun prior to this time. 2/

First identification of 4 SA-2 SAM sites at Leningrad on [] photography took place in [] (Table 1). Subsequent [] photography through [] revealed an additional 32 sites.

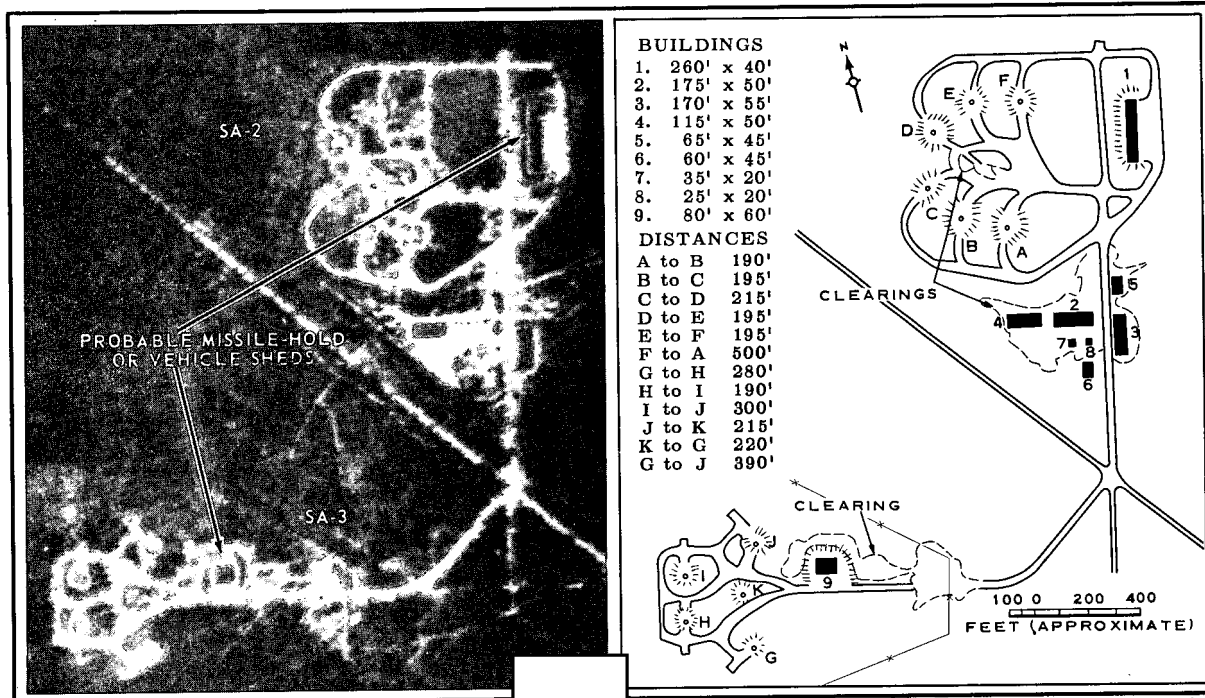


FIGURE 2. CHEVRON-CONFIGURATION SA-2 SITE (D28) AND COLLOCATED SA-3 SITE (D28A).

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Table 1. SA-2 SAM Deployment, Leningrad, USSR
(Shown in chronological sequence of photographic coverage)

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Designator	BE No	Geographic Coordinates	Distance (nm) & Direction from Leningrad	Configuration	Distance (nm) & Direction (Clockwise) to Next SA-2										
C10		59-54-45N 31-02-00E	21.8 E	Fan	5.1 S (C11)	FI									
C11		59-49-25N 31-02-40E	22 ESE	Chev	6.0 S (C12)	FI									
C14		59-39-35N 30-52-10E	23.5 SE	Chev	3.8 SW (C15)	FI									
C15		59-36-50N 30-48-30E	23.5 SSE	Fan	4.2 SW (C16)	FI									
B29		60-01-30N 29-41-45E	20 WNW	Fan	12.4 NW (D30)	CC	FI								
C16		59-33-50N 30-41-45E	25 SSE	Chev	5.7 WSW (C17)	CC	FI Cpld								
C19		59-30-05N 30-14-20E	27 S	Fan	4.0 WNW (C20)	CC	FI Cpld								
C21		59-30-50N 29-56-00E	27.5 SSW	Fan	2.2 NNE (C21A) 4.3 NW (C22)	CC	1/	D	SC, D	CC	FI Cpld				
C21A (Training)		59-32-40N 29-57-30E	25 SSW	Fan	4.5 W (C22)	CC	2/	D	SC, D	CC	FI Prob Cpld				
C22		59-32-25N 29-48-10E	29 SW	Fan	6.1 NW (C23)	CC	3/	D	1/						
C23		59-36-50N 29-39-50E	27.5 SW	Chev	3.9 NNW (C24)	CC	FI Cpld								
C27		59-53-40N 29-26-40E	27 WSW	Fan	6.0 NW (D28)	CC	3/	CC	SC, D	CC	CC	NC	FI Cpld		
C31		60-14-00N 29-34-55E	28 NW	Fan	2.9 E (C32A)	CC	FI Cpld								
C32A		60-14-15N 29-40-00E	26 NW	Fan	2.1 NNE (C32B)	CC	FI Cpld								
C32B		60-15-45N 29-42-20E	27 NW	Fan	1.3 NNE (C33)	CC	FI Cpld								
C33		60-17-05N 29-43-40E	27 NW	Chev	3.4 NE (C33A)	CC	FI Cpld								

NOTE: See key to abbreviations at end of table.

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No significant changes during this period

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Table 1. (Continued)

Designator	BE No	Geographic Coordinates	Distance (nm) & Direction from Leningrad	Configuration	Distance (nm) & Direction (Clockwise) to Next SA-2						
C33A		60-18-50N 29-48-45E	27 NW	Fan	3.0 NE (C34)	CC	FI Cpld				
D28		59-57-50N 29-17-25E	31 N	Chev	12.3 ENE (B29)	CC	FI				
D30		60-10-00N 29-29-55E	31 NW	Fan	3.9 NE (D31)	CC	FI Cpld				
D31		60-12-55N 29-29-55E	29 NW	Chev	2.9 NE (C31)	CC	FI Cpld				
C05		60-12-15N 30-54-40E	25 NE	Chev	5.6 SSE (C06)	CC	NC	4/	Prob Cpld		
C06 (Training)		60-07-10N 30-59-20E	23 ENE	Fan	6.5 SSE (C08)	CC	NC	6/	SC, D		
C34		60-20-15N 29-53-55E	27 NNW	Fan/ Chev	6.6 ENE (C35)	CC	CC	7/	5/	8/	
C35		60-21-30N 30-06-40E	25.5 N	Fan	4.8 ESE (C36)	CC	CC	9/			
C04		60-15-30N 30-52-35E	25 NE	Fan	3.2 SSE (C05)	CC	NC	D	10/		
C08		60-01-20N 31-02-45E	23 ENE	Fan	7.4 S (C10)	CC	NC	D	11/		
C17		59-32-00N 30-30-55E	25.5 SSE	Fan	4.1 WSW (C18)	CC	CC	D	11/		
C18		59-31-10N 30-23-05E	27 S	Chev	5.0 WSW (C19)	CC	CC	D	11/		
C20		59-30-20N 30-06-20E	27 SSW	Chev	5.3 W (C21)	CC	CC	D	11/		
C01		60-20-00N 30-27-05E	23 NNE	Chev	4.8 ESE (C02)	CC	CC	D	D	FI Prob Cpld	
C36		60-21-00N 30-16-05E	23 NNW	Chev	5.3 E (C01)	CC	CC	D	D	FI Cpld	
C24		59-45-30N 29-37-55E	26 SW	Fan	5.2 NNW (C25)	CC	CC	CC	SC, D	CC	FI Cpld
C25		59-45-30N 29-34-00E	25 WSW	Fan	1.8 N (C26)	CC	CC	CC	SC, D	CC	FI Cpld

NOTE: See key to abbreviations at end of table.

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No significant changes during this period

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Table 1. (Continued)

Designator	BE No	Geographic Coordinates	Distance (nm) & Direction from Leningrad	Configuration	Distance (nm) & Direction (Clockwise) to Next SA-2								
C26		59-47-15N 29-32-10E	25 WSW	Chev	7.1 NW (C27)	CC	CC	CC	SC, D	CC	FI Cpld		
C12		59-43-40N 31-04-00E	26 SE	Fan	6.8 SW (C14)	NP	NC	D	SC, D	NC	CC	FI Prob Cpld	
C02		60-18-50N 30-36-50E	25 NNE	Fan	9.0 SE (C04)	CC	CC	D	SC, D	12/	CC	NC	FI Cpld

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- ^{1/}Present; portion visible.
^{2/}Some buildings visible; site area cloud covered.
^{3/}Access road visible; site area cloud covered.
^{4/}Access road present.
^{5/}Access road visible; site unidentifiable.
^{6/}Training area and two sites faintly discernible.
^{7/}Poor quality; white blob at site may indicate construction activity.
^{8/}First positive identification as SAM.
^{9/}Present but unidentifiable as SA-2.
^{10/}Site present; construction status undeterminable.
^{11/}Site present; darkness precludes interpretation.
^{12/}Poor quality precludes interpretation.

Key to abbreviations: FI--first identified; CC--cloud covered; Cpld--completed; SC--scattered cloud cover; D--darkness; NC--not covered; Chev--chevron; NP--not present; U/C--under construction; Colloc--collocated.

NOTE: All Leningrad SA-2 sites not shown as complete are considered as completed at a date which cannot be established.

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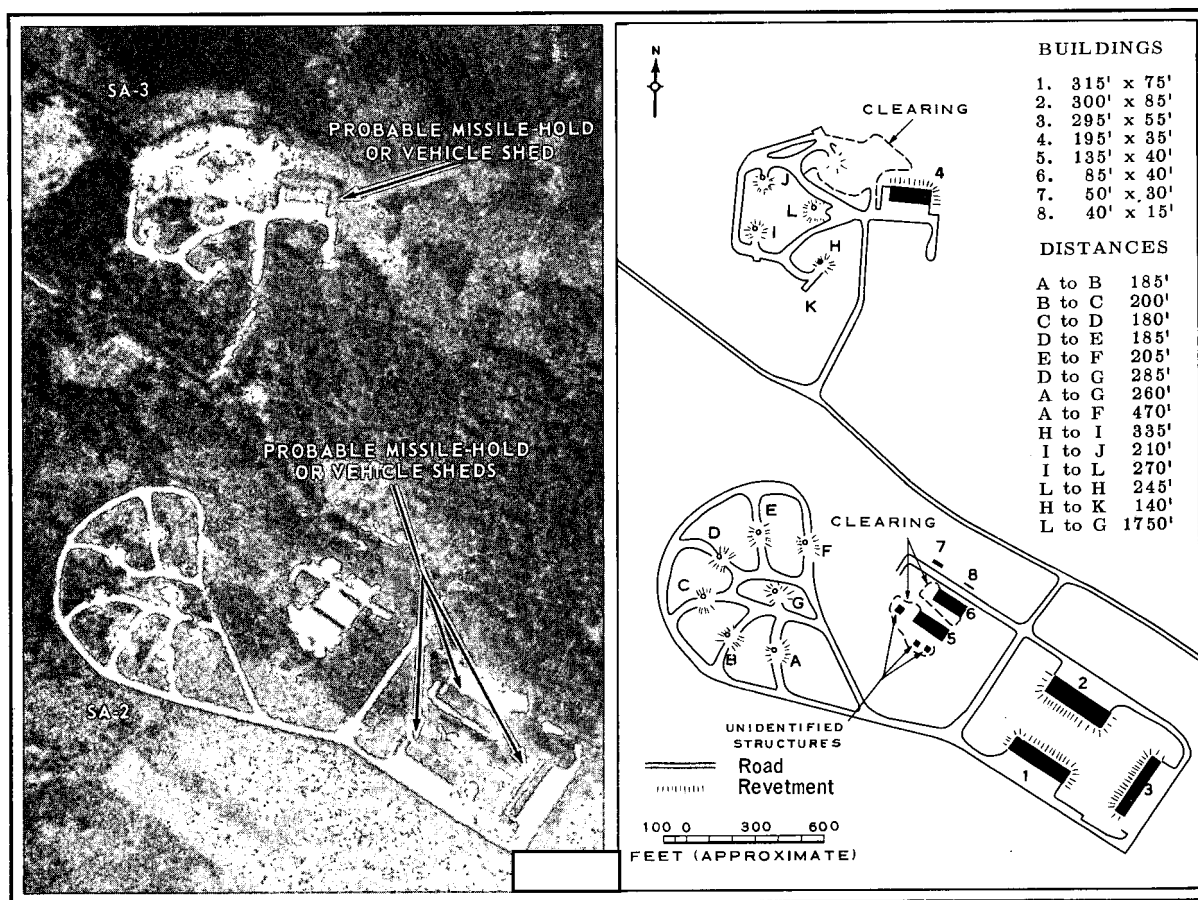


FIGURE 3. TYPICAL FAN-CONFIGURATION SA-2 SITE (B29) AND COLLOCATED G-CONFIGURATION SA-3 SITE (B29A).

These sites are connected by access roads to the Leningrad SAM ring road and range from 20 to 31 nautical miles (nm) in radial distance from Leningrad (Figure 1). The SA-2 sites around Leningrad fall into two categories of configurations, the chevron (Figure 2) and fan (Figure 3).

All of the SA-2 sites have an on-site support

facility consisting of one large revetted building (Figure 2). The exception is Site B-29 on Ostrov Kotlin, which has three such revetted buildings (Figure 3). These buildings probably are used as missile-hold or vehicle sheds. From four to six other smaller buildings comprise the remainder of the typical support area for the SA-2 sites.

SA-3 SAM DEPLOYMENT

A total of 18 SA-3 SAM sites have been identified to date around Leningrad through [redacted] coverage including that of [redacted]. First identification of these sites was [redacted]

made in [redacted] when two of the G-configuration sites were observed west of Leningrad (Table 2). Subsequent coverage has revealed the development of the SA-3 defense

Table 2. SA-3 SAM Deployment, Leningrad, USSR
(Shown in chronological sequence of photographic coverage)

Designator	BE No	Geographic Coordinates	Distance (nm) & Direction from Leningrad	Configuration	Distance (nm) & Direction Clockwise to Next SA-3	Manner of Deployment										
C31A		60-13-55N 29-34-45E	29 NW	G	6.2 NNE (D32)	Colloc (C31)	NP	CC	D	FI Cpld						
D32		60-20-10N 29-37-30E	33 NW	G	7.9 NNE (D34A)	Single	NP	Haze, D	D	FI Prob Cpld						
D28A		59-57-50N 29-17-10E	30.5 W	G	12.6 NE (B29A)	Colloc (D28)	NP	CC	D	CC	FI Prob Cpld					
B29A		60-01-20N 29-41-30E	20.5 WNW	G	12.3 NW (D30A)	Colloc (B29)	NP	D	D	CC	Haze, Snow	CC	FI Cpld			
D30A		60-10-00N 29-23-10E	31.5 WNW	G	7.0 NE (C31A)	Colloc (D30)	NP	CC	D	CC	CC	CC	FI Cpld			
C26B		59-49-30N 29-23-30E	28.0 WSW	J	8.8 NNW (D28A)	Single							NP	3/ FI Prob U/C		Cpld
C01A		60-24-20N 30-24-00E	28.0 N	J	8.5 SE (C02A)	Single							NP	CC	FI Cpld	
C08		59-59-40N 31-04-30E	23.0 ENE	J	Gap in SE quadrant to C21A	Single							NP	4/ FI Cpld Site		
C21A		59-30-30N 29-56-00E	27.5 SSW	J	7.9 NW (C23)	Colloc (C21)							NP	CC	CC	5/ FI Prob Cpld
C86A		60-23-00N 30-09-30E	28.5 N	J	7.3 ENE (C01A)	Single							NP	FI	6/ Cpld	
D24		59-37-30N 29-26-00E	31.5 SW	J	7.9 NW (D25)	Single							NP	CC	FI	7/ Haze
D34A		60-27-20N 29-44-00E	35.0 NW	J	6.6 ENE (D35)	Single									10/ CC	U/C late stages
D35		60-28-00N 29-57-20E	35.0 NNW	J	7.9 SE (C36A)								NP	CC	U/C late stages	CC
C06A		60-07-03N 30-59-40E	23.0 ENE	J	8.6 SSE (C08)	Colloc (Train- ing, C06)							NP	11/ CC	Prob Cpld	

Note: See key to abbreviations at end of table.

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Table 2 (Continued)

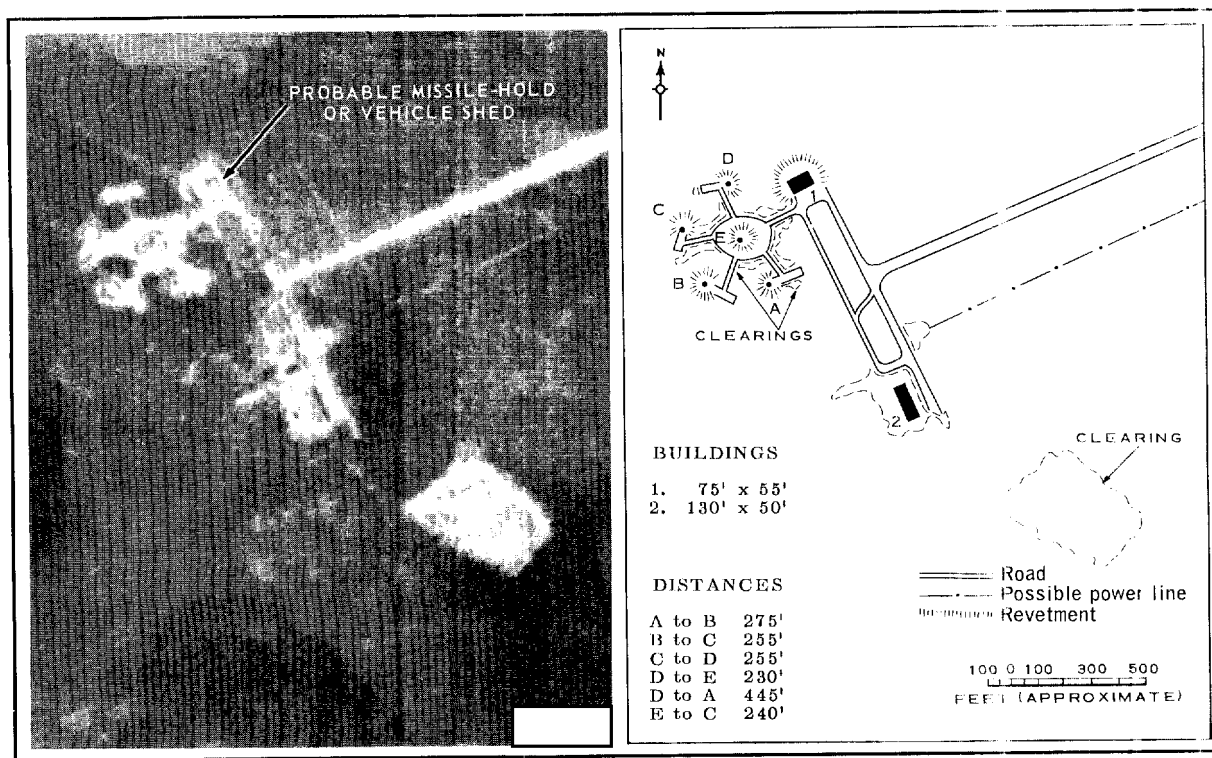
Designator	BE No	Geographic Coordinates	Distance (nm) & Direction from Leningrad	Configuration	Distance (nm) & Direction (Clockwise) to Next SA-3	Manner of Deployment				
D25		59-42 N 29-17 E	34.0 SW	J	7.8 NNE (C24B)	Single, 97	NP	Site U/C	12/	Site U/C late stages
C23		59-34 N 29-42 E	27.5 SW	J	8.0 WNW (D24)	Single	NP	CC	10/	Site U/C late stages
C02A		60-18 N 30-37 E	25.2 NNE	J Prob	8.4 SE (C04A)	Colloc (C02)				NP 14/
C04A		60-14 N 30-52 E	25.6 NE	J	8.3 SSE (C06A)	Colloc (C04)	NP	CC	15/	Cpld

1/ Revised since publication of NPIC/R-49/63, Tabulation and Summary of Deployed SA-3 SAM Launch Sites in the USSR as of 18 December 1962, Apr 63, (TOP SECRET)

- 2/ Long access road under construction from SA-2 Site C27.
 3/ Security fence present; site does not appear complete.
 4/ Access road and security fence present; no site.
 5/ Access road complete.
 6/ Site present; small scale precludes interpretation.
 7/ Two launch positions visible.
 8/ In secure area of NW probable AMM Complex.
 9/ Associated with SW probable AMM Complex.
 10/ Access road complete; site under construction.
 11/ Construction begun; hold area visible.
 12/ Two launch positions under construction; site incomplete.
 13/ Probably complete, trees preclude interpretation of final construction status.
 14/ One launch pad complete; site under construction.
 15/ Security fence present; ground clearing begun.

Key to abbreviations: FI--first identified; CC--cloud covered; Cpld--completed; SC--scattered cloud cover; D--darkness; NC--not covered; Chev--chevron; NP--not present; U/C--under construction; Colloc--collocated.

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FIGURE 4. SINGLY DEPLOYED J-CONFIGURATION SA-3 SITE (D25).

system spreading eastward around the Leningrad ring road. The last two SA-3 sites identified, one of which still is under construction, were observed closing the ring in the northeast quadrant of the defense ring. A gap remains in the southeast quadrant of the ring between sites C08 and C21A (Figure 1) where it is estimated six to eight new SA-3 sites will be constructed.

Ten of the SA-3 sites at Leningrad are deployed singly and eight are collocated with SA-2 sites. A limited analysis of the on-site support facilities at SA-3 sites reveals that each has a revetted hold area located behind the site on the access road. 3/ Where the site is complete, a

building is visible in the revetment, probably as a missile-hold or vehicle shed (Figure 4).

It is difficult to determine the associated support buildings for collocated SA-3 sites since they appear to share support buildings at the SA-2 sites. The minimum support area for a completed SA-3 site appears to consist of a revetted probable missile-hold or vehicle shed, two administrative-type buildings, and at least one or two smaller buildings, possibly to house electronics equipment. This conclusion is based on the support buildings discernible at six of the completed singly deployed SA-3 sites.

LENINGRAD SAM SUPPORT AND STORAGE FACILITIES

There are four SAM support and storage facilities near Leningrad. A future NPIC report will discuss these in detail; however, the follow-

ing highlights about them are included in this report:

1. First evidence of construction was vis-

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ible at one of the facilities in [] when clearing was begun at the support site. This is the site located at 59-34-50N 30-44-00E.

2. Buildings and layout of the support and storage facilities are similar to the Istra-type support and storage facilities at Moscow.

CONCLUSIONS

From the available data the following conclusions are drawn concerning development and construction of the SA-2 and SA-3 defense systems around Leningrad:

1. A SAM defense system for Leningrad was programmed as early []

2. Time limits on completion of the SA-2 SAM system are difficult to establish. Available photography reveals that development was accomplished sometime in the 6-year span between []

3. The pattern of SA-3 SAM site deployment suggests that the SA-2 sites were deployed in

a similar manner around Leningrad.

4. The SA-3 SAM sites at Leningrad are among the first deployed in the USSR. This, together with other factors, suggests that SA-2 sites were deployed at Leningrad early in the development of the overall Soviet defense picture.

5. The deployment of SA-3 SAM sites begun [] is incomplete. On the basis of average distance between SA-3 sites (8.3 nm), it is estimated that six to eight new SA-3 sites will be constructed in the southeast quadrant of the defense ring.

REFERENCES

PHOTOGRAPHY

<u>Mission</u>	<u>Date</u>	<u>Pass</u>	<u>Camera</u>	<u>Frames</u>	<u>Classification</u>
[]	[]	[]	[]	[]	[]

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MAPS OR CHARTS

- ACIC. US Air Target Chart, Series 200, Sheet 0103-24HL, 3d ed, Jun 62, scale 1:200,000 (SECRET)
- ACIC. US Air Target Chart, Series 200, Sheet 0103-25HL, 3d ed, Jun 62, scale 1:200,000 (SECRET)
- ACIC. US Air Target Chart, Series 200, Sheet 0153-4HL, 2d ed, May 63, scale 1:200,000 (SECRET)
- ACIC. US Air Target Chart, Series 200, Sheet 0153-5HL, 3d ed, Aug 63, scale 1:200,000 (SECRET)

DOCUMENTS

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1. NPIC. R-207/63, Tabulation and Summary of Deployed SA-3 SAM Launch Sites Identified in the USSR April-July 1963, Sep 63 (TOP SECRET [REDACTED])
2. CIA. PIC/JR-1008/61, Surface-to-Air Missile Facilities, Kapustin Yar/Vladimirovka Missile Test Center, USSR, Mar 61 (SECRET/[REDACTED]) Downgrading Prohibited
3. NPIC. R-141/63, A Preliminary Study of On-Site Support Facilities at SA-3 SAM Sites in the USSR, Jul 63 (TOP SECRET [REDACTED])

RELATED DOCUMENTS

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- NPIC. R-49/63, Tabulation and Summary of Deployed SA-3 SAM Launch Sites Identified in the USSR as of 18 December 1962, Apr 63 (TOP SECRET [REDACTED])
- NPIC. R-131/63, SA-2 SAM Training Facilities in the USSR, Jul 63 (TOP SECRET [REDACTED])
- NPIC. R-183/63, Towers at SA-3 SAM Sites, USSR, Aug 63 (TOP SECRET [REDACTED])
- NPIC. R-236/63, Search for Elevated Electronics Equipment at SA-3 SAM Sites, USSR, Oct 63 (TOP SECRET [REDACTED])

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REQUIREMENT

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Army. [REDACTED]

NPIC PROJECT

J-80/63 (partial answer)

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